comes to an emergency department can improve the accuracy of diagnosing infarction in patients with nondiagnostic ECGs. The number of hours of chest pain is key to interpreting cardiac enzyme results. Myocardial infarction patients with chest pain for 3, 6, 9, and 12 hours had elevated CK-MB values in nearly half, more than half, greater than 75%, and 100% of cases, respectively. About 80% of all patients with myocardial infarction with nondiagnostic ECGs had elevated CK-MB levels within three hours of presentation; the combined sensitivity of serial ECGs and CK-MB determinations in emergency departments approaches 90%.

Myoglobin is released earlier than CK-MB from damaged myocardial cells (within 2 to 4 hours), but it disappears from the serum within 6 to 12 hours, about the time of the expected CK-MB elevation. Serial measurements using new rapid assays for myoglobin may be 100% sensitive for detecting myocardial infarction in the first six hours after the onset of chest pain. Other serum markers of myocardial damage, such as creatine kinase-MM subtypes, light-chain myosin fragments, and the troponin in protein, are currently under investigation. Troponin appears to have early diagnostic characteristics similar to those of CK-MB in patients with infarction. It also detects about half of the patients with unstable angina, and levels remain elevated for days after the infarction.

A trend in the evaluation of chest pain is the introduction of cardiac emergency or chest pain centers, usually within the confines of existing emergency departments. The diagnostic tools described above are combined with traditionally nonemergency cardiac testing. Echocardiography can reveal regional wall motion abnormalities within the first hour after coronary artery occlusion occurs. Thallium and technetium scintigraphy can show areas of decreased myocardial perfusion within four to six hours of infarction, but share the same problem as echocardiography in distinguishing new from old infarcts. A preliminary study of treadmill exercise stress testing in 32 emergency department patients with atypical chest pain suggests that coronary artery disease can be ruled out in carefully selected patients. With demands for more rapid and accurate diagnosis and for better resource use, the future evaluation of chest pain patients will most likely involve some type of outpatient holding area in emergency departments.

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Prehospital 'Do-Not-Resuscitate' Orders—A New Option

ONE OF THE MOST DIFFICULT ethical issues in medicine is when and under what circumstances to withhold what are collectively referred to as "resuscitative measures." Practicing physicians are familiar with do-not-resuscitate (DNR) orders in the hospital setting; DNR orders spare patients undesired and often futile interventions. Yet physicians also need to know about prehospital DNR systems and to take action to make sure all required documentation is in place before a critical event. Health care professionals have a responsibility to educate their patients about the appropriate use of the prehospital system. This includes not only when to call 911, but when not to call.

Despite educational efforts, families still call 911 for terminally ill patients. Families desire treatment short of resuscitation; others seek verification that death has occurred; still others think they are expected to notify authorities through an emergency number. Prehospital personnel may have only seconds in a confused situation to determine a patient's resuscitation status.

In light of the natural tendency to call the emergency 911 number when a death occurs, physicians must plan ahead to ensure that appropriate patients possess valid prehospital DNR orders. A well-designed prehospital DNR system avoids subjecting patients to unwanted and invasive measures, takes pressure off families in crisis situations, and relieves professionals of uncertainty surrounding legal obligations to initiate unwanted resuscitative measures.

New California state guidelines strongly encourage local agencies to enact prehospital DNR protocols. Once signed by a physician and the patient, prehospital DNR orders indicate that the patient or surrogate understands the advantages and disadvantages of attempted resuscitation, is making an informed decision, and wishes to proceed with a DNR order. Patients are offered medallions inscribed with "Do Not Resuscitate—EMS" similar to the Medic Alert brăcelet. The new statewide DNR form will be respected by prehospital personnel no matter where the patient is.

Emergency medical system protocols regarding prehospital DNR status commonly include provisions of palliative treatment despite the DNR status; guidelines for the management of the deceased, including removal of the body; and access to grief-support counseling for families, as well as "critical-incident stress debriefing" for providers, as needed. In this way, costly resuscitation attempts will not be started if they are not desired or medically indicated. By signing prehospital DNR orders, physicians will spare their patients intrusive, unwanted, and futile interventions and allow prehospital health care providers to honor a patient's right to death with dignity.

The California Medical Association (CMA) Committee on Emerging Trends and the California State Emergency Medical Services Authority have produced a standard DNR request form now available to physicians

through the CMA (415-541-0900, extension 5175); several other states are developing or have developed similar systems.

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